

WHAT IS CLAIMED IS:

1. A bi-directional optical ring network having a first ring network and a second ring networks for providing a protection switching, comprising:

5 a plurality of nodes, having optical add/drop multiplexers, each being provided on the first and second ring networks and including a demultiplexer and a multiplexer, each of which has a capacity of $1 \times N$;

a pair of switching devices provided across the first and second ring networks and connected between the optical add/drop multiplexers and fiber optic links connected with
10 another node; and

wavelength interleavers, each being provided on both ends of each optical add/drop multiplexer provided on the first and second ring networks and including three ports, of which one port is connected to each switching device and allows for passing signals of all wavelength bands, another port allows for passing only signals of some
15 wavelength bands processed on any one of the first and second ring networks, and the third port allows for passing only signals of the other wavelength bands processed on the other.

2. The optical ring network as claimed in claim 1, wherein when the failure occurs at one fiber optic link of any one of the first and second ring networks, any one of the pair
20 of optical switching devices, which is connected to one end of the fiber optic link at which the failure occurs and is located on a transmitting side in a direction toward which the optical signals proceed, switches inputted optical signals to the other one of the first and

second ring networks.

3. The optical ring network as claimed in claim 1, wherein when the failure occurs at one fiber optic link of any one of the first and second ring networks, any one of the pair
5 of optical switching devices, which is connected to one end of the fiber optic link at which the failure occurs and is located on a receiving side in a direction toward which the optical signals proceed, switches inputted optical signals to the other ring network.

4. A bi-directional optical ring network having first and second ring networks for
10 providing a protection switch, comprising:

a plurality of nodes having optical add/drop multiplexers, each being provided on the first and second ring network and including a demultiplexer and a multiplexer, each of which has a capacity of $1 \times N$;

a pair of switching devices provided across the first and second ring networks and
15 connected between the optical add/drop multiplexers and fiber optic links connected with another node, each switching device having input/output ports for looping back optical signals of wavelength bands processed on any one of the first and second ring networks, and input/output ports for transmitting optical signals of wavelength bands processed on the other ring network; and

20 wavelength interleavers, each being provided on both ends of each optical add/drop multiplexer provided on the first and second ring networks and including three ports, of which one port is connected to each switching device and allows for passing signals of all

wavelength bands, another port allows for passing only signals of some wavelength bands processed on any one of the first and second ring networks, and the third port allows for passing only signals of the other wavelength bands processed on the other.

5 5. The optical ring network as claimed in claim 4, wherein when the failure occurs at one fiber optic link of any one of the first and second ring networks, any one of the pair of optical switching devices, which is connected to one end of the fiber optic link at which the failure occurs and is located on a transmitting side in a direction toward which the optical signals proceed, switches inputted optical signals to the other ring network.

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 6. The optical ring network as claimed in claim 4, wherein when the failure occurs at one fiber optic link of any one of the first and second ring networks, any one of the pair of optical switching devices, which is connected to one end of the fiber optic link at which the failure occurs and is located on a receiving side in a direction toward which the optical
15 signals proceed, switches inputted optical signals to the other ring network.